

CLAIMS

What is claimed is:

1. A hydraulic drive apparatus, comprising:
 - a housing having a first pump chamber, a second pump chamber, a gear chamber, a first opening in a first end adjacent to the first pump chamber and a second opening in a second end opposite the first end and adjacent to the second pump chamber;
 - a first pump rotatably mounted in the first pump chamber;
 - a first pump shaft drivingly engaged to the first pump;
 - a second pump rotatably mounted in the second pump chamber;
 - a second pump shaft drivingly engaged to the second pump;
 - an input shaft drivingly engaged to the first and second pump shafts;
 - a first center section having hydraulic porting formed therein secured to the first end of the housing to close the first opening and a second center section having hydraulic porting formed therein secured to the second end of the housing to close the second opening;
 - a first hydraulic motor affixed to the first center section and hydraulically connected to the first pump and a second hydraulic motor affixed to the second center section and hydraulically connected to the second pump.
2. The drive apparatus as set forth in Claim 1, wherein a first output axle extends from and is driven by the first hydraulic motor and a second output axle extends from and is driven by the second hydraulic motor.
3. The drive apparatus as set forth in Claim 1, wherein a first charge pump is mounted on the first center section and driven by the first pump shaft.

4. The drive apparatus as set forth in Claim 3, wherein a second charge pump is mounted on the second center section and driven by the second pump shaft.
5. The drive apparatus as set forth in Claim 1, wherein each of the first and second hydraulic motors is a geroller type of motor.
6. The drive apparatus as set forth in Claim 1, wherein each of the first and second hydraulic motors is an axial piston-type motor.
7. The drive apparatus set forth in Claim 1, wherein each of the first and second hydraulic motors is a gear motor.
8. The drive apparatus as set forth in Claim 1, wherein the first center section further comprises a first pump portion that is separate from and removably secured to a first motor portion.
9. The drive apparatus as set forth in Claim 8, wherein a first spacer is interposed between the first motor portion and first pump portion.
10. The drive apparatus as set forth in Claim 8, wherein the second center section further comprises a second pump portion that is separate from and removably secured to a second motor portion.
11. The drive apparatus as set forth in Claim 10, wherein a second spacer is interposed between the second motor portion and the second pump portion.
12. The drive apparatus as set forth in Claim 1, wherein the input shaft comprises a first end and a second end, wherein the first end extends from the housing and is coupled with a prime mover.
13. The drive apparatus as set forth in Claim 12, wherein both ends of the input shaft extend from opposite sides of the housing.

14. The drive apparatus as set forth in Claim 13, further comprising an input pulley mounted on the first end of the input shaft and an output pulley mounted on the second end of the input shaft.
15. The drive apparatus as set forth in Claim 1, further comprising a cooling fan mounted on a first end of the input shaft and an input pulley mounted on a second end of the input shaft.
16. The drive apparatus as set forth in Claim 1, further comprising a first motor shaft engaged to the first hydraulic motor and extending through the first center section.
17. The drive apparatus as set forth in Claim 16, further comprising a first axle shaft separate from and driven by the first motor shaft.
18. The drive apparatus as set forth in Claim 17, wherein the first hydraulic motor comprises a first cylinder block, and the cylinder block and the axle shaft are located on opposite sides of the first center section.
19. The drive apparatus as set forth in Claim 18, further comprising a second motor shaft engaged to the second hydraulic motor and extending through the second center section.
20. The drive apparatus as set forth in Claim 19, further comprising a second axle shaft separate from and driven by the second motor shaft.
21. The drive apparatus as set forth in Claim 20, wherein the second hydraulic motor comprises a second cylinder block, and the second cylinder block and the second axle shaft are located on opposite sides of the second center section.
22. A hydraulic drive apparatus, comprising:
 - a housing having a first pump chamber, a second pump chamber, a gear chamber, a first opening in a first end adjacent to the first pump chamber and a second opening in a second end opposite the first end and adjacent to the second pump chamber;

a first pump rotatably mounted in the first pump chamber;

a first pump shaft drivingly engaged to the first pump;

a second pump rotatably mounted in the second pump chamber;

a second pump shaft drivingly engaged to the second pump and coaxially aligned with the first pump shaft;

an input shaft having a first end and a second end mounted in and extending through the housing generally perpendicular to each of the pump shafts and drivingly engaged to the first and second pump shafts, wherein the first end of the input shaft extends from one side of the housing and the second end of the input shaft extends from an opposite side of the housing;

a first center section having hydraulic porting formed therein and being comprised of a first pump section that is separate from and removably attached to a first motor section, wherein the pump section is secured to the first end of the housing to close the first opening;

a second center section having hydraulic porting formed therein and being comprised of a second pump section that is separate from and removably attached to a second motor section, wherein the second pump section is secured to the second end of the housing to close the second opening;

a first hydraulic motor affixed to the first motor section and hydraulically connected to the first pump and a second hydraulic motor affixed to the second motor section and hydraulically connected to the second pump.

23. The drive apparatus as set forth in Claim 22, wherein a first spacer is interposed between the first motor portion and the first pump portion.
24. The drive apparatus as set forth in Claim 23, wherein a second spacer is interposed between the second motor portion and the second pump portion.

25. The drive apparatus as set forth in Claim 23, further comprising a first charge pump mounted on the first center section and drivingly connected to the first pump shaft.
26. The drive apparatus as set forth in Claim 25, further comprising a second charge pump mounted on the second center section and drivingly connected to the second pump shaft.
27. The drive apparatus as set forth in Claim 22, further comprising an input pulley mounted on a first end of the input shaft and an output pulley mounted on a second end of the input shaft.
28. The drive apparatus as set forth in Claim 22, further comprising a cooling fan mounted on a first end of the input shaft and an input pulley mounted on a second end of the input shaft.
29. The drive apparatus as set forth in Claim 22, wherein the first motor comprises a first cylinder block mounted on one side of the first center section and a first axle shaft mounted on a second side of the first center section opposite to the first side.
30. The drive apparatus as set forth in Claim 29, the second motor comprises a second cylinder block and a second axle shaft, wherein the second cylinder block and second axle shaft are positioned on opposite sides of the second center section.